

REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated July 1, 2006. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

As outlined above, claims 2-3 stand for consideration in this application, wherein claims 2-3 are being amended to correct formal errors and to more particularly point out and distinctly claim the subject invention.

All amendments to the application are fully supported therein, including page 8, lines 23-25 of the specification. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

35 U.S.C. §102(e) rejection

Claims 2-3 were rejected under 35 U.S.C. §102(b) as being anticipated by Gerion et al. (*J. Phys. Chem. B* 2001). Applicants respectfully traverse this rejection for the reasons set forth below.

According to the M.P.E.P. §2131, a claim is anticipated under 35 U.S.C. §102 (a), (b), and (e) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Claim 2

The Examiner repeatedly asserted that Gerion's disclosure of "photobrightening" the nanoparticles by irradiation of aerated solutions encompasses the size-selective photoetching recited in claim 2, and thereby shows regulating particles sizes since some particles are dissolved and the relative monodisperse particles remain in the solution and monodisperse the semiconductor nanoparticles since the solution is brightened. The Examiner further asserted that the same results of dissolution of the surface of the semiconductor nanoparticles, peeling, monodispersity and conversion are inherent since the same critical steps are being performed in Gerion as the method recited in claim 2. Applicants strongly but respectfully disagree.

Size-selective photoetching utilizes the phenomena wherein the energy gap of a semiconductor nanoparticle increases due to the quantum-size effect as the particle size thereof decreases and that a metal chalcogenide semiconductor is oxidatively dissolved in the presence of dissolved oxygen when irradiated with light (Page 8, lines 20-23 of the specification). In the size-selective photoetching, semiconductor nanoparticles having a wide distribution of particle sizes are irradiated with monochromatic light of a wavelength shorter than a wavelength of the semiconductor nanoparticles' absorption edge (page 8, line 23-25 of the specification). Therefore, only larger sized semiconductor nanoparticles are selectively photoexcited and dissolved, and thus, only smaller sized semiconductor nanoparticles are sorted (page 5, lines 3-5 of the specification). To clarify the features of photoetching as recited in claim 2, claim 2 is being amended so as to recite that the semiconductor nanoparticles are irradiated with monochromatic light of a wavelength shorter than the wavelength of the semiconductor nanoparticles' absorption edge so that the surface of the semiconductor nanoparticles is dissolved and peeled by the size-selective photoetching, and particle sizes of the semiconductor nanoparticles are regulated and the semiconductor nanoparticles are monodispersed by the dissolution.

Gerion shows the synthesis of biocompatible water-soluble silica-coated CdSe/ZnS. Gerion also shows the influence of the silica shell on the optical properties of nanocrystals (page 8862, left column, lines 17-23). However, in the optical characterization, Gerion merely shows that the photobrightening of the nanocrystals is observed under CW (continuous wave) laser irradiation (page 8869, left column, lines 40-42). Gerion does not show or suggest either explicitly or implicitly that the semiconductor nanoparticles are irradiated with monochromatic light of a wavelength shorter than the wavelength of the semiconductor nanoparticles' absorption edge so that the surface of the semiconductor nanoparticles is dissolved and peeled by the size-selective photoetching, particle sizes of the semiconductor nanoparticles are regulated and the semiconductor nanoparticles are monodispersed by the dissolution.

Furthermore, contrary to the Examiner's assertion, "photobrightening" and "photoetching" do not occur concurrently. "Photobrightening" of nanoparticles in Gerion means increasing the fluorescence intensity of nanoparticles. Electrons are used to dissolve particles during the process of photoetching. Therefore, if nanoparticles are size-selectively photoetched as recited in claim 2, larger size nanoparticles will not be photobrightened as set forth above.

Therefore, Gerion does not show every element recited in claim 2. Accordingly, claim 2 is not anticipated by Gerion.

Claim 3

Claim 3 has the substantially same features as those of claim 2, at least with respect to the semiconductor nanoparticles are irradiated with monochromatic light of a wavelength shorter than the wavelength of the semiconductor nanoparticles' absorption edge so that the surface of the semiconductor nanoparticles is dissolved and peeled by the size-selective photoetching, and particle sizes of the semiconductor nanoparticles are regulated and the semiconductor nanoparticles are monodispersed by the dissolution. As such, the arguments set forth above are equally applicable here. Claim 2 being allowable, claim 3 must also be allowable.

35 U.S.C. §103(a) rejection

Claims 2-3 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Gerion in view of Torimoto et al. (*J. Phys. Chem. B* 2001). This rejection is respectfully traversed for the reasons set forth below.

According to the Manual of Patent Examining Procedure (M.P.E.P. §2143),

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both not be found in the prior art, not in the applicant's disclosure.

Furthermore, referring to *In re Fulton*, M.P.E.P. §2143. 01 (I) sets forth as follows:

The court emphasized that the proper inquiry is “whether there is something in the prior art as a whole to suggest the desirability, and thus obviousness, of course, of making the combination,” not whether there is something in the prior art as a whole to suggest that the combination is the most desirable combination available.

Furthermore, referring to *In re Mills*, M.P.E.P. §2143. 01 (III) sets forth as follows:

The mere fact that reference can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination.

The secondary reference of Torimoto states that the principle of the size-selective photoetching relies on both facts that metal chalcogenide semiconductor particles are photocorroded in an aqueous solution under irradiation. However, as set forth above, the primary reference of Gerion's photobrightening does not aim to do photoetching. Gerion shows or suggest no desirability to selectively dissolve only the larger nanoparticles. Therefore, it can be said that Gerion does not explicitly or implicitly suggest the desirability to combine with a step of photoetching nanoparticles. As set forth above, the mere fact that reference can be combined or modified does not render the resultant combination obvious unless the prior art suggests the desirability of the combination.

In sum, there is no suggestion or motivation in either Gerion or Torimoto to combine these features explicitly or implicitly, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claims 2-3. Accordingly, claims 2-3 are not obvious in view of all the prior art cited.

Obviousness Double Patenting Rejection

Claims 2-3 were rejected pursuant to the judicially-created doctrine of obviousness-type double patenting as being unpatentable over claims 1-9 of U. S. Patent No. 6,911,082 B2. Submitted herewith is a Terminal Disclaimer. As such, withdrawal of this rejection is respectfully requested.

Conclusion

In view of all the above, Applicants respectfully submit that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to

contact the Applicants' undersigned representative at the address and phone number indicated below.

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